REMARKS

In response to an Office Action mailed on October 25, 2004, Applicant respectfully requests that the above-listed Amendments be entered and the Application be reconsidered. With entry of the above-listed Amendments, claims 1, 22 and 23 are amended, and claims 24 and 25 are new. Claims 1, 3-8, 13-17 and 20-25 are presented for examination. Of these, claims 1 and 22 are independent, and the remaining claims are dependent.

The Applicant appreciates the time and courtesy extended by the Examiner to George Jakobsche of this office during a telephonic interview on March 1, 2005. Proposed claim amendments and distinctions over the prior art were discussed.

The Examiner objected to the Abstract, because it allegedly does not sufficiently describe the disclosure. The Abstract has been amended to overcome this objection.

The Examiner objected to claims 1, 22 and 23 due to various informalities. These claims have been amended to overcome the objections, without narrowing the scope of the claims.

The Examiner correctly interpreted "the second face" in claims 1, 22 and 23 to mean "the outside face." These claims have been so amended to make their wordings consistent, without narrowing the scope of the claims.

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The Examiner rejected claims 1, 3-8, 13-17, 20 and 21 under 35 U.S.C. 103(a) as being obvious over U.S. Pat. No. 4,194,028 to Sirtl, *et al.* ("Sirtl") in view of U.S. Pat. No. 5,911,824 to Hammond ("Hammond"), Japanese patent number JP 2000-247779 A to Yamamoto ("Yamamoto"), U.S. Pat. No. 4,741,925 to Chaudhuri ("Chaudhuri") and Applicant's admitted prior art (AAPA).

The Examiner noted that Sirtl discloses introducing gas into a hollow crucible, towards its bottom and inside walls, via a plurality of spaced-apart holes around the periphery of a gas introduction pipe. The Examiner also noted that the limitation added in the previous Amendment ("dividing at least a portion of the reactive gas flow entering the enclosure into first and second non-zero fractions, wherein the first fraction of the reactive gas flow is fed to the inside face of the at least one substrate and the second fraction of the reactive gas flow is fed to the second (i.e. outside) face of the least one substrate ...") does not require only one of the fractions to be fed to only one of the faces of the substrate, implying that the added limitation does not distinguish the claimed invention over Sirtl.

Claim 1 has been amended to recite "wherein ... the second fraction of the reactive gas flow is fed to only the outside face of the at least one substrate." (Emphasis added.) Sirtl does not

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disclose feeding a second fraction of the reactive gas flow to only the outside face of a substrate. As the Examiner noted, in Sirtl, all fractions (i.e., both the first and second non-zero fractions) of the reactive gas are fed to both the inside and the outside of the crucible.

No art of record, either alone or in combination, discloses or suggests a method of densifying porous substrates that includes "dividing at least a portion of the reactive gas flow entering the enclosure into first and second non-zero fractions, wherein the first fraction of the reactive gas flow is fed to the inside face of the at least one substrate and the second fraction of the reactive gas flow is fed to only the outside face of the at least one substrate," as recited in amended claim 1. For at least this reason, claim 1 is believed to be allowable. Claims 3-8, 13-17, 20 and 21 depend directly or indirectly from claim 1. These claims are, therefore, believed to be allowable, for at least the reasons discussed above with respect to claim 1.

The Examiner rejected claims 22 and 23 under 35 U.S.C. 103(a) as being obvious over U.S. Pat. No. 5,904,957 to Christin, *et al.* ("Christin") in view of AAPA or Yamamoto. Christin discloses densifying porous substrates by stacking the substrates to form an annular or hollow stack, which extends in a longitudinal direction

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and defines an interior passage. Christin disposes spacers 3 or 33 between the substrates to create spaces (through which gas can flow) between the substrates. (Column 2, lines 49-52; column 5, lines 38-43; and column 6, lines 58-65.) Christin also discloses densifying fiber preforms for diverging parts of thruster nozzles by stacking the preforms. (Column 8, lines 1-9 and Fig. 3.) In both cases, reactive gas is introduced into a reaction chamber containing the stack of substrates or the stack of thruster nozzles.

It is not believed that Christin can be properly combined with the AAPA or Yamamoto to render the present Application obvious, at least because: (1) such a combination would be nonfunctional and (2) Christin teaches away from the claimed invention. Furthermore, it is not believed that the art of record, alone or in combination, discloses or suggests all the elements recited in claim 22. These reasons are discussed in detail below.

In all cases, Christin's stack of objects creates an interior longitudinal passage for the reactive gas. (Column 2, lines 45-52; column 4, lines 35-41; and Figs. 1, 2, 3 and 4.) The reactive gas is introduced only into either the interior longitudinal passage or the empty space around (i.e. outside) the stack, but not both. (Column 3, lines 19-22; column 6, lines 55-56; and column 8, lines

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63-66.) Christin's system relies on gas being introduced into one of these two spaces, then being forced to pass through the spaces between the stacked objects. (Column 2, line 59 to column 3, line 2.) In this way, fresh gas is supplied to the surfaces along the spaces between the objects. (Column 3, lines 43-64.) In the case of the stacked substrates, Christin requires the interior longitudinal passage be closed at the top, to force the gas through the spaces between the stacked objects, and so the gas cannot escape through the top of the interior longitudinal passage. (Column 2, line 63 to column 3, line 2; and column 6, lines 47-48.)

Christin requires any stack of substrates to form at least one annular or hollow stack with an interior passage surrounded by the stacked substrates. (Column 4, lines 35-41.) However, stacking a plurality of hollow (as that term is used in the present Application) shaped objects, as suggested by the Examiner, would not create the interior passage that Christin requires. In the present Application, "hollow" means an object, such as a bowl, that has a concave inside surface without any holes. (Application: page 1, lines 16-23.) Thus, a stack of hollow shaped objects would not allow the gas to flow vertically through the stack, as Christin requires. Consequently, only the bottom hollow shaped

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object would receive any gas along its inside face. All the hollow objects stacked above the bottom object would receive no fresh gas along their inside faces. Thus, Christin cannot be combined with the AAPA or Yamamoto to produce the claimed invention.

Furthermore, Christin teaches away from the claimed invention. Christin teaches away from introducing gas to both the interior longitudinal passage and into the space around the stack. (Column 3, lines 8-14 and 18-21; column 6, lines 49-47; and column 8, lines 63-66.) In contrast, claim 20 recites "directing a first non-zero portion, but not all, of the reactive gas flowing through the enclosure into the inside volume of the substrate ... and feeding a second non-zero portion of the reactive gas flowing through the enclosure to the outside face of the substrate."

In addition, claim 22 has been amended to recite "directing a first non-zero portion, but not all, of the reactive gas ... by means of a tooling extending into the inside volume of the substrate." None of the cited art discloses or suggests directing reactive gas by means of a tooling extending into the inside volume of a substrate. Sirtl discloses introducing gas into a hollow crucible, towards its bottom and inside walls, via a gas introduction pipe. However, such a gas pipe is not "tooling," as that term is used in the art and in the present Application.

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Tooling is used to direct some, but not all, of the gas flowing in a densifying enclosure. Tooling is not used to introduce gas into the enclosure. In contrast, Sirtl's pipe 8 is used to introduce the gas into the enclosure, and all the gas flowing through Sirtl's enclosure flows through the gas introduction pipe.

No art of record, either alone or in combination, discloses or suggests a method for densifying a porous substrates that includes "directing a first non-zero portion, but not all, of the reactive gas flowing through the enclosure into the inside volume of the substrate by means of a tooling extending into the inside volume of the substrate, wherein the concave inside face of the substrate is swept in full by the first portion of the reactive gas flow; and feeding a second non-zero portion of the reactive gas flowing through the enclosure to the outside face of the substrate," as recited in amended claim 22. For at least this reason, claim 22 is believed to be allowable.

Claims 23-25 depend directly or indirectly from claim 22. These claims are, therefore, believed to be allowable, for at least the reasons discussed above with respect to claim 22.

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For all the foregoing reasons, it is respectfully submitted that the present Application is in a condition for allowance, and such action is earnestly solicited. The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present Application.

Respectfully submitted,

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